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ABSTRACT

This paper is based on a 2-year research and development project undertaken at the School of Education, University of Leeds (England). The aims of the project were to work with 25 early years practitioners from both education and care traditions using an action research model to identify what activities in their settings were defined as literacy and mathematics, the nature of staff understanding of how children learn to be literate and numerate, and the relationship between early years' workers and parents' perceptions of how children acquire literacy and mathematical understanding. It explains that the purpose of the project was to design curriculum guidelines in literacy and mathematics for very young children. The paper offers and describes the following three exemplars from the projects undertaken by members of the research team: Communication Skills between Mothers and Babies; Mark-Making and Emergent Writing in a Parent and Toddler Group; and Mathematical Concepts in the Home and the Nursery Class. The three exemplars give a flavor of the creative potential of combining care and education approaches to curriculum design. The curricula materials are different from those emanating from "school" frameworks in the emphasis they place on the potential for learning in the "everyday" lives of children and their caregivers. (Contains 10 references.) (NKA)

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The Co-construction by Early Years Care and Education Practitioners of Literacy and Mathematics Curricula for Young Children.

by Angela Anning

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The Co-construction by Early Years Care and Education Practitioners of Literacy and Mathematics Curricula for Young Children

Angela Anning, Professor of Early Childhood Education, University of Leeds

Paper presented at the British Educational Research Association Annual Conference, Queen's University of Belfast, Northern Ireland, August 27-30, 1998

Introduction

The paper is based on a two year research and development project led by Professors Angela Anning and Anne Edwards based at the School of Education, University of Leeds. The project was funded jointly by three Local Authorities. The aims of the project were to work with twenty five early years practitioners from both education and care traditions using an action research model to identify what activities in their settings were defined as literacy and mathematics, the nature of staff understanding of how children learn to be literate and numerate and the relationship between early years workers' and parents' perceptions of how children acquire literacy and mathematical understanding. The purpose of the project was to design curriculum guidelines in literacy and mathematics for very young children. Details about the methodology of the research will be given in Anne Edward's paper for the symposium.

Background

The starting point for this paper is that curricula are socially constructed. They are designed by adults with particular beliefs about what constitute appropriate activities for children at particular moments in history. The beliefs of these adults emanate from the dominant values of the culture and society in which they have grown up and now live and work, and more specifically from their training, professional backgrounds and daily work experiences in early childhood contexts. Though we talk about a 'child-centred' approach to curriculum design and provision, curriculum models involve the projection of adults' judgements about what constitutes childhood and what children should learn.

The two year period of the research project, January 1997- July 1998, was a challenging time for early childhood services in England and Wales. In 1997, at the start of the project , preparation for vouchers and the associated inspections of providers' ability to 'teach' towards the Desirable Outcomes for children by the time they entered compulsory schooling figured prominently in our dialogues with members of the project team. Though the vouchers were short-lived, over the next

eighteen months our providers' preparations for delivering the Desirable Outcomes and for the associated round of inspections of all pre-school settings with four-year-olds, kept curriculum issues high on their agenda.

The population of project members varied at some periods over the eighteen months as personal and/or professional pressures or changes in roles took their toll and meant that members withdrew. However, with the help of Local Authority officers, an overall balance was maintained between those who worked in day-care settings (representing the independent and voluntary sectors, childminders and Local Authority provision) and those who worked in educational settings (representing nursery schools, units attached to schools and teachers working within Family Centres). The constituencies brought with them distinctive preoccupations and voices or discourses from their respective working traditions of care and education.

Uniting both traditions were essentially 'female' priorities and discourse about supporting families, forging caring professional relationships with children and their parents or carers and promoting the social/emotional development of young children. Underpinning their personal and professional preoccupations and discourse at the micro-level of their workplaces were the responses they had to make to the radical changes at the macro-level of two successive governments in child care and pre-school policy. The imperative at a policy level was to 'rationalise' provision by integrating services for young children and their families. The policy was based on essentially 'male' priorities for accountability for the spending of public money and for promoting institutional learning.

The policy change was driven by demands from employers for a more flexible, mainly part-time, cheaper, non-unionised workforce - a pattern into which they found women fitted more passively than men. In 1951 12% of the workforce in England were women. By 1998 the percentage had risen to 30%. Over half of women with children under 5 now work.

There has also been a steady rise in the number of 'single' parents, re labelled in New Labour speak as 'lone' parents, to a current 1.7 million. 1 million of these lone parents are unemployed or inactive in work. 4 out of 10 lone mothers have no qualifications. The New Deal policy of the Welfare to Work programme is designed to offer lone parents opportunities to train or work in order to wean them off state benefits. There will need to be a rapid expansion of child care provision, particularly in urban areas, for the policy to work. Early Years Development Partnerships in each Local Authority are charged with drawing up development plans to indicate how they will meet the new child care needs in their areas.

Pre-school education as well as child care have become high profile within the policies of all major political parties. The political response to parental demand for nursery education by the Tories was the voucher scheme. Vouchers guaranteed pre-school places to all 4-year-olds whose parents wished to take them up. The ideology underpinning the scheme was that market forces,

driven by the preferences of parents, would determine where places for 4-year-olds would be taken up. Wherever they were, the placement had to offer an 'educational' component within the Desirable Outcomes framework. The version of 'nursery' education enshrined within the Desirable Outcomes curriculum was one that would lead 4-year-olds efficiently into the statutory school National Curriculum defined within a subject framework. From a Labour platform David Blunkett has indicated that the next priority will be for the entitlement of all 3-year-olds to pre-school education.

A further important policy change which impacted on providers of services for young children in England and Wales was the introduction (from September 1998) of a Baseline Assessment for all children in the first half term in which they enter compulsory schooling. Most children now start school at the age of four. Though the Desirable Outcomes covers six areas of learning : personal and social development, language and literacy, mathematics, knowledge and understanding of the world, physical development and creative development, Baseline Assessment will assess children's achievements in the first three areas only. Pre-school providers were uncomfortably aware that children's scores at school entry would reflect on the efficiency (rather than effectiveness?) of their delivery of these areas of learning. The measures were likely to be used by parents as indicators of the 'best' place for their pre-school children and by policy makers, at local and national levels, as measures of 'value for money'. Inevitably, given their traditional perceived strength in promoting children's social and emotional development, it was their expertise in delivering the 'school' subjects of language and literacy and mathematics with which the workers in the project and their Local Authority officers were preoccupied.

The project

The adults' understanding of literacy and mathematics

It was important to access the thinking of the project team about literacy and mathematics before we engaged with the first action research cycle. At the start of the project we audited the members' main concerns by asking them to make individual written responses on a grid. They were asked to list their three main concerns in their professional roles about literacy and three about numeracy. Their responses were coded under six categories: knowledge/information; resources/curriculum; staff development needs; parents/home/school; assessment/recording /reporting; children's learning. The coded responses are summarised in figures 1 and 2. The ticks in each cell represent the total number of responses from all twenty five project members coded into these categories.

Knowledge/ Information	Resources/ curriculum	Staff development needs	Parents Home/'School'	Assessment/ Recording/ Reporting	Children's Learning
1.Approaches to teaching reading	1.Appropriate resources	1.Learning to value home literacy	1.How to involve parents actively	1.Assessment strategies	1.Responding to bilingualism
2.Developmental sequences of literacy learning	2.Funding of resources	2.Lack of teaching experience	2.Raising parents' awareness of value of family literacy	2.Diagnosing/ responding to 'failing' children	2.Preparation for school literacy
3.Cross cultural approaches to literacy, mark making	3.Range and appropriateness of activities	3.How to develop quality 1-1 interactions with children	3.Encouraging parents to have positive attitudes to libraries etc.	4.	3.Encouraging boys to like books
4.Desirable outcomes for literacy	4.Book lending programmes	4.	4.Supporting parents' own literacy needs	5.	4.Responding to needs of mixed age groups
5.	5.Suitable books for babies	5.	5.Environmental settings and reading	6.	5.Targeting 0-12 month babies

Figure 1. Three main concerns about literacy

Knowledge/ Information	Resources/ curriculum	Staff development needs	Parents Home/'School'	Assessment/ Recording/ Reporting	Children's Learning
1. Developmental sequences in maths learning	1. Lack of suitable resources	1. 'Teaching' numeracy	1. Low levels of numeracy in community	1. Strategies for diagnosing children's learning needs	1. Quality of learning experiences in maths
2. Desirable outcomes for numeracy	2. Structured play/quality activities	2. Staff personal confidence in maths	2. Informing parental expectations	2. Baseline assessment	2. Preparation for school maths
3. National Curriculum	3. Narrow approaches to numeracy (e.g. just counting)	3. Vocabulary of maths	3. Involving parents	3. Diagnosing/catering for 'failing' children	3. Involving children with E2L in mathematical learning
4. Cultural differences in key concepts	4. Lack of time given to numeracy	4. Response to inspection criteria			4. Catering for needs in mixed age groups
		5. Building support networks			5. Gender issues

Figure 2. Three main concerns about numeracy

Across all six categories into which their responses were coded there was surprising consistency in their responses to concerns about literacy and numeracy. There were some differences however. In the first category, coded under knowledge/information about the field, they prioritised increasing their personal knowledge about 'the teaching of reading'. In contrast in

mathematics they prioritised increasing their knowledge about 'developmental sequences in maths learning'. In the third category, perceived staff development needs there was a clear difference between their concerns about Literacy and Numeracy. Project members expressed many concerns about their own confidence in mathematics and in 'teaching' numeracy. In sharp contrast in literacy their concerns were more about how to involve parents actively in children's literacy learning rather than about their own abilities to 'teach' aspects of literacy. They expressed similar concerns about resources to deliver the curriculum in literacy and numeracy. In the fourth category, home/school issues, a range of concerns was expressed about involving parents in literacy learning, but in mathematics the only reference relating to parents/home/school was to 'low levels of numeracy in the community'. As the project unfolded it was in this category, maths in everyday life, that the greatest shift in professional thinking was to develop. Concerns about Assessment focused on assessment as a diagnostic tool, particularly for 'failing' children and on Baseline Assessment. In the final category, children as learners, concerns were expressed in both literacy and mathematical thinking about organisational issues (catering for learning needs in mixed age groups), gender issues, catering for children with English as a second language and preparation for schooling, but significantly, only in mathematical thinking, about 'the quality of learning experiences '. Overall individuals expressed greater confidence in their ability to promote children's learning in literacy than in numeracy.

Project members were asked to list what they would like to know more about, and their responses are summarised in Figure 3.

Knowledge/ Information	Resources/ curriculum	Staff development needs	Parents Home/'School'	Assessment/ Recording/Reporting	Children's Learning
1. Additional perspectives in literacy and numeracy	1. Integration of activities instead of one off worksheets	1. Raising staff awareness of literacy/numeracy learning	1. Involving parents	1. Recording progress	1. Giving babies a good start
2. Information about the National Curriculum	2. Appropriate curriculum for 4 yr olds	2. How to teach numeracy			2. E2L support for 0-5s
3. Research evidence - what works?	3. Resources reflecting continuity needs/ concerns	3. Raising staff confidence in teaching			
4. Developmental sequences	4. Accessing resources				
5. Desirable Outcomes					

Figure 3. What I would like to know more about

They wanted to enhance their own professional knowledge about literacy and numeracy in general and in particular about the requirements of the National Curriculum and Desirable Outcomes models. They wanted to know more about how to involve parents in their children's learning. To a lesser extent they wanted to know more about how to teach literacy and numeracy- a surprising disjunction with the concerns expressed in Figures 1 and 2. They did want more information about how to record children's progress in literacy and numeracy, something that Ofsted would be keen to see demonstrated in their settings. There were a scattering of requests for information about resources, E2L support for very young children, and how to give babies 'a good start'. Even at this early stage of the project they wanted more information about research evidence, 'what works' as they pragmatically put it.

Knowledge in the Workplace

We planned some workshops for the team in response to the audit over the next few months. However, we wanted the project to build on the knowledge and expertise 'embedded' in the workplace practices of this experienced group of practitioners rather than to import a 'disembedded' curriculum model into the project.

It was clear from conversations we were having with practitioners in their settings that the Desirable Outcome model, designed by early years educators at the (then) School Curriculum and Assessment Authority, was intimidating to practitioners in the care sector. A manager of an independent day nursery described her staffs' reactions when she introduced the document at a staff meeting. One practitioner responded to the mathematics section with a heartfelt, ' I didn't even get me CSE in it. I can't teach maths!' When confronted with the descriptors for knowledge and understanding of the world, another member of staff responded with a truculent, 'I were crap at geography.'

Some project members from day-care settings, traditionally characterised by an emphasis on the 'low status', female discourse about health, social welfare and safety of the children, were apologetic about their unfamiliarity with educational jargon and perceived lack of knowledge about educational practices. Others were confident that they did not want to be 'teachers'. A deputy manager of a Local Authority Children's Centre said:
'Some of our four year olds are here with us for a long day. They've got all their school years ahead of them. We're not teachers. None of us has been trained how to teach a child to write their name, or read, or count. We did the basic things on NNEB courses, but we are not teachers and we don't feel qualified to teach those kind of things to the children. You hear horror stories about nurseries teaching the children the alphabet and then teachers have to re-teach them sounds - you

know they've been taught 'ay, bee, cee' and they want 'a, b, c' - and we're not teachers. But we can give them all the opportunities they need to prepare them for school.'

The children in this setting were offered a well-planned range of activities. The experienced staff were also quick to respond to and extend spontaneous episodes of children's learning.
'We don't do much formal in the nursery... but we cover the six (Desirable Outcome) areas in play ... we'll do science experiments. But we don't have the four year olds coming out to do tracing or worksheets or whatever. It's all done through fun, practical, play activities - tie-dye, baking or whatever'.

At first the staff panicked when confronted with the Desirable Outcome requirements. Their confidence in what they were achieving was undermined. A visit from a Local Authority early years adviser reassured them.
'It wasn't till she came in that we realised we're doing what we should be doing anyway and we shouldn't all be getting in a flap. It's our observations that help us to target what needs attention and what to plan. But we do lots more planning than we used to.'

Project members with educational backgrounds characterised by the 'high status', male discourse about school subjects talked more confidently about the beginnings of reading and writing and were comfortable with the curriculum jargon of the Desirable Outcomes framework. They were less confident about the beginnings of mathematical understanding. They did not apologise for their unfamiliarity with the discourse of social work and their lack of knowledge about the expertise of day care for young children. It probably never occurred to them to do so.

Our belief was that a curriculum for integrated services had to be embedded in the best practices of both traditions. It was also important to confront the issue of their different discourses and negotiate, through dialogue and debate between those from the different sectors, a language for the curriculum with which both sectors felt comfortable. To stimulate such debate it was important that each sector have access to evidence of what the other actually did, rather than to rely on assumptions. Only when these assumptions were confronted by evidence of realities would defensive posturing and mutual suspicion begin to break down.

Evidence based Inquiry

The first action research cycle focused on gathering evidence of what constituted learning in literacy and mathematics from their own practices and those of their colleagues in their workplace settings. The purposes of collecting evidence were twofold. Firstly, they were to provide the stimulus for exchange of ideas across the constituencies of the project team.

Secondly, the successive cycles of review, plan, act and monitor provided opportunities for individuals to deepen their understanding of why some curriculum activities and approaches to involving colleagues, parents and children in learning were more effective than others.

We had anticipated that project members would play safe, particularly on the first cycle of reflection on action, and opt for language/literacy based inquiry where mostly they were already quite confident. When we asked them to indicate on an age phase and area of learning grid the foci for their first projects, they were divided evenly between literacy and mathematics.

	Literacy	Numeracy
0-18 months	Mother/baby guidelines/beginnings of literacy/communications Books with babies - 6 mths - 18 mths Writing/mark making (12 mths -3 yrs)	Numeracy learning with babies through songs/rhymes/games/ cooperation with parents Maths across different cultural contexts at home and in nursery setting.
18 months-3 years	Language and social development/music activities (6 months-24 months ⌫ over 2s next) Early literacy and nursery rhymes/parental involvement Emergent writing with children age 2-3 years	Involving childminders in developing children's mathematical thinking 'Everyday' maths opportunities, parental involvement
3-5 years	Mark making/representation across a range of centre activities	Opportunities for mathematical experiences - 'at home' and 'in nursery' links Developing Numeracy through a High/Scope workshop approach. Positive approaches to mother tongue/E2L learning using mathematics as a stimulus Staff development - Desirable Outcomes in maths

Figure 4: Foci for the projects

Anne Edward's paper will provide more information on the processes by which the project team moved through several cycles of inquiry, each time broadening and deepening their professional understanding. Drawing on the extensive data base of the project field notes, records of workshop activities, documentation, photographs and video material, I will use exemplars of curriculum design and development from the action research cycles of individual project members to illustrate our tortuous but exhilarating route towards a curriculum framework. The

framework will be published in a desk-topped version for use within the three Local Authorities and a summary version for a national audience.

Exemplar One: Communication Skills Between Mothers and Babies

A manager of an Early Years Centre serving an inner city council estate with a social work background selected as her focus communication skills between mothers and babies. She was concerned that there was a gap in the training of her staff in caring for babies and intended to disseminate the findings of the project to the centre staff as part of the centre development plan. She wanted to start with an initiative targeting a number of mothers categorised as having learning difficulties or whose babies were defined as 'at risk'. She drew on the expertise of a local nursery teacher and speech therapist to plan six morning workshops: singing nursery rhymes, noise-makers and listening, talking to baby, playing with baby indoors, listening and looking outdoors and review of what we have done. She targeted six mothers, all of whom were experiencing acute problems related to housing, money and relationships and whose mental health and self-esteem were fragile. She had a sound understanding of their needs.

The workshops were planned in great detail, but the delivery was relaxed and informal. The manager and speech therapist understood the need to model 'motherese' by ' mucking in' and playing with the babies and their mothers. Predictably attendance of the mothers was erratic, but the video taped evidence of episodes of those who did attend shows a gradual unfreezing of their tense, uncommunicative faces and bodies as they learned how to enjoy the communication games with their babies.

The manager of the Centre began to encourage the mothers to keep a record of what they achieved at the workshops, using an instant camera to record events, and to stick them into a small lined exercise book. These became significant objects for the mothers. They reluctantly parted with them in order for us to take copies for the project data base on condition we returned the originals to them. For once in their lives their ability to mother was being validated instead of questioned. The mothers began to make records of other activities they did with their babies at home. The evidence of growing confidence in communication between the mothers and babies captured by the video tapes, exercise books and field notes made a strong impact on the project team. It was profound in its ordinariness.

At a later stage of the project, pulling the insights gained from her inquiry together into curriculum guidelines for speaking and listening with babies, she listed the following principles of practice in supporting babies learning to speak and listen:

What we are looking for in children	What adults can do
0-12 months speaking and listening • make sounds • experiment with tongues, mouths, • facial muscles • smile and laugh • make and sustain eye contact • wait for, respond to the physical behaviours of children and adults • listen to, predict, anticipate sounds • take turns • know that there are different languages • recognise different tones and registers of voices • listen to music	• model and repeat sounds • play with facial expressions, mouth and tongue movements • smile and laugh • make and sustain meaningful eye contact • model and reinforce games involving physical movements (e.g. peekaboo) • talk with babies • encourage and exchange pauses, sounds in turn taking • sing to babies • model the rhythms, pitches, intonations of speech and musical sequences of sounds • value bilingualism • develop close emotional/physical bonds with babies • demonstrate animation, drama, playing with words and sounds • share fun and humour in playful behaviour with babies • be consistent in giving feedback • have authentic emotional involvement with babies • play music to babies

Figure 5 Curriculum Guidelines for Speaking and Listening with Babies

Please use the first part of the table of the Principles of Practice in Supporting Learning: Language. If you haven't done this here are the lists to enter into a chart

Discussion

As an observer/researcher I was struck by the fact that this exemplar went straight to the heart (literally and metaphorically) of the parents' daily interactions with their babies and offered support to them in a manner which was respectful of rather than a denial of their personal and domestic realities. In this context the aim was to promote better communication skills between mothers and their babies; but the manager was certain that there was a need for similar consciousness raising for the staff in the centre.

Peter Elfer and Dorothy Selleck are in the third and final year of research into the care and learning needs of children under three in nurseries. Their findings, due for publication, will emphasise the importance of key adults forming authentic emotional relationships with children in care. Their analysis of 150 hours of observation of babies in 15 nurseries indicates that where organisational systems allocate care workers to attend to the needs of too many children, they are

driven to depersonalise relationships with the children and to concentrate on their 'presenting' health, feeding and safety needs. It is simply not humanly possible for them to form close bonds with so many children without suffering from emotional 'overload'; so they retreat to safer ground of caring for children's bodies. Elfer draws on Shaw's (1995) analysis of the emotional substructure of education and Salzberger-Wittenburg et al's (1983) discussion of the emotional experience of teaching and learning. Practitioners have always understood the power of the affective features of learning, but as Kress (1997) has pointed out ' At the moment we know very little about all of this; and we know very little because the issue is not quite respectable on the public agenda.' (p.110) At last researchers are turning their attention investigating the affective responses of learners and perhaps to helping practitioners to articulate their tacit knowledge about its significance.

Exemplar Two: Mark-making and Emergent Writing in a Parent and Toddler Group

One of the project team was working on a Single Regeneration Budget scheme with the dual aims of helping parents/carers to learn more about their children's education while at the same time encouraging the adults to further their own learning through training or employment opportunities. She had a background in teaching. She had been supporting a literacy programme based at a primary school in a weekly parent and toddler group. Each week she set out pencils and crayons with paper on a table, but she noted that children spent little time there, and parents even less. She decided to make mark-making and emergent writing the focus of her research.

She planned a sequence of activities to focus each week on strategies to encourage mark-making and writing skills. The target areas were: hand-eye co-ordination, fine motor control, experimenting with media, teaching the vocabulary of drawing and emergent writing. She observed that while she was at the table, children came willingly to join in the activities, appeared to enjoy them and were making progress in the skills targeted for progression. Despite her years of experience as a teacher, she confessed that she found it a challenge to judge exactly when to extend, challenge, or direct children's learning in mark-making.

In her research diary she noted that she believed that the parents were not engaging with what she was doing with the children at the mark making table. She wrote:
' At first I thought I had created a cocoon around children's learning and essentially left parents outside. However closer observations revealed that many of the parents were listening to and observing the interactions that were taking place.'

She made the strategic decision to mount a display of the children's mark-making and emergent writing for the parents. She was staggered by its impact:

'The display became an amazing tool through which to discuss the children's writing/drawing development. I would point out recurring patterns, movements or letters, representational drawings and the inventions of letters'.

There were so many examples of the children's drawing/writing (too many to be displayed) that she suggested that parents might like to use an exercise book in which to mount their own children's work to record their development. The parents brought in photographs of the children to stick on the front of the exercise books and it became a focus for parent and child to review achievements on a weekly basis. Once again a simple exercise book became a significant object in the process of sharing understandings between parents and professionals. The project member noted: ' The eagerness of parents to stick their children's work into the books and record their descriptions really took me by surprise.' One parent said to her: 'I used to think he was just scribbling'.

For the next cycle of research she decided to move on to helping children and parents to connect mark-making with communication in the real world. She knew that the local Post Office was a regular port of call for parents on their way to and from the Parent and Toddler Group meetings. She asked the parents to lift the children up to see what was going on behind the counter and talk to them about writing and posting letters, paying bills, buying stamps, weighing parcels, cashing giros etc. When they came in for the next session she launched the idea of making a role play area for the children based on the Post Office. Over the next few weeks the parents collected resources - junk mail, postcards, greetings cards, envelopes, forms and old stamps - and made equipment - a post box, a counter - for the Toddlers Post Office. They were comfortable joining the children in role play. The Toddler Post Office provided many opportunities for parents/carers and their children to share literacy activities in an area they had planned and constructed together: writing, drawing, filling in forms, talking about symbols and logos and filling out lottery tickets. One child persuaded her mother to set up a sub post office at home! Several parents reported that their toddlers were watching them closely when they were writing. One said: 'He often wants to write himself now when he sees me writing.' It was suddenly OK for parents and children to write and draw companionably together. The exclusiveness of teacher directed mark-making at the 'work table' was replaced by genuine exchanges of expertise in 'joint involvement episodes' with both adults and children paying respectful attention to each others' meaning making.

Discussion

One of the insights the cycle of inquiry gave this experienced practitioner was that it was important for adults to be with the children whilst they were experimenting with mark-making

and writing in order to tune into their efforts to make meaning and understand their significance for the child. Kress (1997) writes:

'The child's written signs are the effect of their meaning-making actions, arising out of their interest, using what they have available as representational means. .... The signs which children make are, despite their differences from adult form, fully meaningful in every sense. The child's actions have to be understood as productive and transformative of their own representational resources, as well as those of the community around them.' (p.17)

Another important self realisation was that by adopting 'school' strategies of sitting and apparently 'teaching' children, she had inadvertently excluded the parents from engaging with their children. Once she had demystified the 'mark-making table', by letting the parents into the magic circle of 'teacher ' knowledge by quite literally 'displaying' the secrets to them, they became hooked on their own personal journeys of discovery about the meanings their children were making in marks.

It is this approach that makes the philosophy of the famous Reggio Emilia pre-school centres so compelling.(Edwards et al 1993) Pedagogues, practitioners, parents and children are engaged together in exploring the many languages children use to express their ideas and communicate their meaning-making to others. Malaguzzi (1987), the founding father of the innovation, argued that 'our image of the child should be of one that is rich in potential, strong, powerful, competent and most of all connected to adults and other children'. In this exemplar both children and adults were empowered by acknowledging the central role of learning associated with their everyday lives and languages.

Exemplar Three: Mathematical Concepts in the Home and the Nursery Class

A nursery teacher working in a unit attached to an inner-city primary school with children from families of many different ethnic and cultural groups worked collaboratively with a senior member of the Local Authority Multi-cultural Services for her project. The children in the school spoke up to twenty different languages altogether, but Arabic and Somali were the dominant languages in the community. The teacher and multi-cultural services officer had two different but related agendas. They were both interested in mathematics as a 'universal language' and wanted to explore what mathematical concepts the children brought to the nursery unit from informal out of school and home experiences. One of them was also interested in the relationship between musical chords and rhythms and mathematical sequences and patterns, and more specifically in the similarities and differences between children's experiences of different forms of music from Indian, African, English and other European cultures and the effect of these different experiences on their mathematical thinking.

They invited parents to attend a meeting and of the ten who responded, five were interested in being involved in the project. As many fathers as mothers attended the meeting. The nursery served an area where students from the two universities in the town tended to rent accommodation. The researchers speculated that the words 'research project' drew in fathers when previously they would have been unlikely to attend meetings about school matters.

The researchers talked informally to the parents about the sort of mathematics the children did in the unit and the informal mathematics children engaged in out of school. Parents were given a note-book to record any activities they felt were 'mathematical' and a tape recorder to record songs or conversations at home which included mathematics. They were also given a tape of the number songs and rhymes used regularly in the unit to listen to and sing along with at home.

The five families were visited at home by the nursery teacher. She chatted with them about what they had identified at home as mathematics in everyday events. She also showed them a simple teddy bear counting game she regularly used with the children at group times and left one for them to use at home. Her diary notes record:
'During my first home visit parents were happy that their children were noticing house numbers in the street and pointing out car registration numbers and bus/house numbers. C's Mum and K. and H.'s father both expressed surprise that their children were now seeing numbers all around them.'
Some parents felt confident in recording in their note books 'mathematical' events and conversations at home, but most were happier chatting about what they had noticed. These included: counting when washing up, filling and emptying the washing machine, hanging out and taking in washing, putting clothes away in drawers, counting stairs, counting amounts in cooking, setting the table, recognising programme channel numbers on the video/TV remote control, counting buttons when dressing. Most families said that they played some kind of card, domino, dice or board game with their children.

None of the families felt confident enough to bring back to school tape recordings of conversations or songs from home. One of the intriguing findings of the project was that the idea of songs/nursery rhymes specially categorised as for children seemed alien to some of the families. For them singing was what all the family did together, though they sang different kinds of songs for different purposes - lullabies would be for bed-time, ballads for storying and strongly rhythmical songs for dancing. When asked if they would like to contribute songs to a school song book, a Yemeni family brought in a version of their national anthem.

Meanwhile in the unit the staff 'tried to offer things children see at home more (e.g. a play shop with money as an extension of talk about shopping with mum and dad, table setting in the home

corner or at snack time, sharing out food in role play and for snacks). 'They made a point of emphasising mathematical language and concepts in English, Arabic and Somali in sand and water play, in simple board games and in the construction area, bought new picture/counting books of everyday events and introduced new group games and songs involving numerical, positional and sequential language and concepts.

For both researchers the benefits of the project were a tangible sense of children and their parents being excited by mathematics in both informal and formal settings. The most significant benefit was the closer relationships with the five families involved forged by the home visits and additional dialogue with them generated by the project. Though the initial focus of the home visits was mathematics, the talk ranged around many other issues about the nursery and the families' hopes and fears for their children. Parents completed a simple questionnaire at the end of the project to evaluate how useful they had found the project. A summary of their responses was given by the teacher:

'Parents found that they do not need to spend money on special games and activities to encourage number recognition and counting. The child's world has been enhanced by sharing everyday experiences of number with their parents and the nursery staff. Parents noticed that many everyday activities were more interesting as they encouraged their children to enjoy numbers. Many parents had learned from their children (for example through the teddy bear squares game).'

An extract from one of the researcher's diaries gave an honest evaluation of what they had learned:

'I do not think the study was deep enough to answer our questions diagnostically. We did make much more than a stab at it though. We could say that we saw enough from our observations to conclude with confidence that children do bring mathematical concepts into the nursery unit. We can say something about what these concepts are, but are careful about describing them too closely for fear of their being seen as too definitive, prescriptive and conclusive'.

The issue of the role of music in young children's learning was explored by several other members of the project team, but a proper discussion of this area of inquiry warrants another paper.

Discussion

Research into mathematics in pre-fives settings in the UK has indicated that staff are not confident in their ability to foster young children's mathematical thinking. For example, in a project based in pre-school settings in Strathclyde (Kleinberg and Menmuir 1995) staff were

asked to record and describe mathematical events over a three week period. Of the 134 events recorded 5% were in story telling, 6% in craft, 8% in games and puzzles play, 17% in block/construction, 14% in dough/sand/water, 13% in role play, 10% during snack time or registration and 26% elsewhere in the settings activities. Most of these included an adult present - 30% with a small group of children, 19% with one child and 17% with a large group. Of those without an adult present 15% were recorded in small groups of children, 10% in pairs and 8% with lone children. However, a key overall finding was that the staff were uncertain about what to categorise as mathematical events and expressed the need to improve their own knowledge of mathematics. Munn (1993 and 1997) has published with others similar research findings about both staff lack of personal confidence in mathematics and their uncertainty about how to promote mathematical thinking with very young children. She argued that in order to increase the amount and improve the quality of mathematics activities in pre-school settings they should be based in familiar nursery activities, use language at the children's level but designed to promote children's use of mathematical vocabulary and be based on interactive games, preferably with open-ended outcomes.

As project directors we were surprised by the high level of commitment amongst the team members to investigate mathematics in their settings. Traditionally a female dominated workforce carries negative attitudes to the subject from their own educational experiences. But by embedding mathematical activities in the 'bread and butter' of a nursery curriculum - construction play, domestic play, songs and games - they gained confidence in their ability to 'deliver' this aspect of the Desirable Outcomes.

It is significant that high on their list of concerns about numeracy at the start of the project was to have more information about 'developmental sequences in maths learning'. The legacy of Piagetian models of children's development in published maths schemes and resources lingers on in the emphasis in 'school' mathematics on sorting, matching, joining and separating sets, reading and writing numbers up to 10. We saw the effects of this legacy on some of the activities recorded and resources used by project members. In some cases we were aware of such activities being translated inappropriately into work with very young children in day care settings. However, there is increasing evidence that in informal, out of school settings (including day-care settings) there is a powerful alternative emphasis in activities defined by the adults as mathematical which focuses on counting, recognition of a wide range of numerals from 'real life' contexts such as clocks, packaging, stamps, handling money, and on social sharing.

Both Munn (1994) and Aubrey (1997) argue that teachers are unwilling to abandon their developmental stages based approach to developing mathematical thinking, often because expensive and extensive scheme based resources in which schools have invested heavily use Piagetian stages as their framework. Young children's informally acquired mathematical learning

through everyday counting and exposure to numerals is therefore ignored when children start school. It may be that in the field of mathematics, the approach of day care staff, based on the common sense, goodenough parenting model of developing mathematical thinking, may begin to influence those in educational contexts with responsibility for teaching young children to be mathematicians. Here is another example then of the creative potential of combining the very different traditions and discourses of care and education in the best interests of young children.

Conclusion

In this paper it has been possible to offer only three exemplars from the projects undertaken by members of the team. More will be discussed in a forthcoming book by Angela Anning and Anne Edwards. The three have given a flavour of the creative potential of combining care and education approaches to curriculum design. The curricula materials are different from those emanating from 'school' frameworks in the emphasis they place on the potential for learning in the 'everyday' lives of children and their carers. If more practitioners were willing to enter into meaningful dialogue about their working realities and priorities, we may be entering a period in early childhood when exciting new curriculum models may be generated from turning tensions between the worlds of care and education into creative rather than destructive forces.

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